CLAIMS

What is claimed is:

1.   A switching amplifier, comprising:

a power stage having an input and an output, the output providing an amplified

pulse modulated output signal; and

a digital correction circuit having a first input for receiving a pulse modulated

input signal, a second input coupled to the output of the power stage,

and an output coupled to the input of the power stage, the digital

correction circuit providing a corrected pulse modulated signal to the

input of the power stage, corrected as a function of a duty ratio of said

pulse modulated input signal.

2.   The switching amplifier of claim 1, the digital correction circuit having

multiple correction modes dependent upon said duty ratio.

3.   The switching amplifier of claim 2, the digital correction circuit performing, in

each correction mode, a discrete-time pulse edge correction on at least one of a

leading edge and a trailing edge of the pulse modulated input signal to provide the

corrected pulse modulated signal.

4.   The switching amplifier of claim 2, the digital correction circuit further

comprising, an analog to digital converter having an input coupled to the output of the

power stage and an output providing a digital correction signal, a sampling time of the

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analog to digital converter changing as a function of said duty ratio.

5.   The switching amplifier of claim 2, the digital correction circuit further providing for smooth transitions between said multiple correction modes.

6.   The switching amplifier of claim 1, the digital correction circuit further comprising:

       an error amplifier having a first input for receiving a pulse modulated reference signal, and a second input for receiving the output of the power stage, and an output for providing an analog correction signal;

       an analog to digital converter coupled to the error amplifier for converting the analog correction signal into a digital correction signal; and

       a digital pulse edge corrector having a first input connected to the output of the analog-to-digital converter, a second input for receiving the pulse modulated input signal and an output coupled to the input of the power stage.

7.   The switching amplifier of claim 6, the analog to digital converter having a controllable sampling time that varies as a function of said duty ratio.

8.   The switching amplifier of claim 6, the error amplifier comprising a multiple order error amplifier.

9.   The switching amplifier of claim 8, further comprising:

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an error amplifier saturation detector for sensing a saturation state of said error amplifier, and for adjusting an order of said error amplifier as a function of said saturation state.

10.   A method for correcting nonlinearities in a switching amplifier, comprising:

amplifying a pulse modulated input signal to produce an amplified pulse modulated output signal;

comparing said amplified pulse modulated output signal with a pulse modulated reference signal to produce an error signal;

correcting said digital pulse modulated input signal as a function of the error signal, and as a function of a duty ratio of said digital pulse modulated input signal.

11.   The method of claim 10, further comprising, integrating said error signal using a multiple order integration process.

12.   The method of claim 11, further comprising:

sensing a saturation state of said multiple order integration process; and

adjusting an order of said multiple order integration process as a function of a saturation state.

13.   A switching amplifier, comprising:

a power stage having an input and an output, the output providing an amplified pulse width modulated output signal;

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a multiple-order controllable error amplifier having a first input for receiving a digital pulse width modulated reference input signal, a second input coupled to the output of the power stage, and an output providing an error signal;

an order control unit coupled to receive the error signal, for sensing a saturation state of the error amplifier, and for adjusting an order of the error amplifier as a function of the saturation state;

a correction circuit having an input coupled to receive the error signal and an output coupled to the input of the power stage, the correction circuit providing a pulse width modulated signal to the input of the power stage as a function of the error signal.

14.   The switching amplifier of claim 13, the power stage comprising a half bridge power stage.

15.   The switching amplifier of claim 13, the power stage comprising a full bridge power stage.

16.   The switching amplifier of claim 15, the power stage including a power supply, the output of the power stage being permitted to saturate to a level of the power supply.

17.   A method for correcting nonlinearities in a switching amplifier, comprising:

amplifying a pulse modulated input signal to produce an amplified pulse

modulated output signal;

comparing said amplified pulse modulated output signal with a pulse modulated reference signal to produce an error signal;

integrating said error signal using a multiple order integration process;

sensing a saturation state of said multiple order integration process;

adjusting an order of said multiple order integration process as a function of said saturation state; and

adjusting said pulse modulated input signal as a function of the error signal.

18.   The method of claim 17, further comprising:

correcting said pulse modulated input signal as a function of a duty ratio of said pulse modulated input signal.

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